Instructions: Try these problems from the textbook as practice (answers below).

Problems

7-16. Find and sketch the domain of the function.

7. $f(x,y) = \sqrt{x-2} + \sqrt{y-1}$
9. $q(x,y) = \sqrt{x} + \sqrt{4-4x^2-y^2}$
11. $g(x,y) = \dfrac{x-y}{x+y}$
13. $p(x,y) = \dfrac{\sqrt{xy}}{x+1}$
15. $f(x,y,z) = \sqrt{4-x^2} + \sqrt{9-y^2} + \sqrt{1-z^2}$

23-31. Sketch the graph of the function.

23. $f(x,y) = y$
25. $f(x,y) = 10 - 4x - 5y$
27. $f(x,y) = \sin x$
29. $f(x,y) = x^2 + 4y^2 + 1$
31. $f(x,y) = \sqrt{4-4x^2-y^2}$

45-52. Draw a contour map of the function showing several level curves.

45. $f(x,y) = x^2 - y^2$
47. $f(x,y) = \sqrt{x} + y$
49. $f(x,y) = ye^x$
51. $f(x,y) = \sqrt[3]{x^2+y^2}$

53. Sketch both a contour map and a graph of the function $f(x,y) = x^2 + 9y^2$ and compare them.

67-70. Describe the level surfaces of the function.

67. $f(x,y,z) = 2y - z + 1$
69. $g(x,y,z) = x^2 + y^2 - z^2$

Answers

7. $[2,\infty) \times [1,\infty) = \{(x,y) : x \geq 2, y \geq 1\}$
9. $\left\{(x,y) : x \geq 0, x^2 + (y/2)^2 \leq 1\right\}$
11. $\{(x,y) : y \neq -x\}$
13. $\{(x,y) : xy \geq 0, x \neq -1\}$
15. $[-2,2] \times [-3,3] \times [-1,1] = \{(x,y,z) : -2 \leq x \leq 2, -3 \leq y \leq 3, -1 \leq z \leq 1\}$